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REMARKS

This is a full and timely response to the non-final Official Action mailed April 6, 2006. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

Claim Status:

Claims 39-60 have been withdrawn under the imposition of a previous Restriction Requirement and are marked "withdrawn" above. No claims have been cancelled or added in this paper. Thus, claims 1-38 and 61-65 are pending for further action.

Allowable Subject Matter:

In the recent Office Action, the Examiner indicated the presence of allowable subject matter in claims 8, 25-29, 37 and 38. Applicant wishes to thank the Examiner for this indication of allowable subject matter.

Claim Objections:

Claim 29 was objected to as being a substantial duplicate of claim 25. While Applicant disagrees that claim 29 was a substantial duplicate of claim 25, claim 29 has been amended herein and now recites subject matter that is entirely distinct from that recited by claim 25. Therefore, the objection to claim 29 should be reconsidered and withdrawn.

The Office Action also objected to claim 30 because of a recitation that was held to lack antecedent basis. Accordingly, claim 30 has been amended herein. This amendment

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does not, and is not intended to, narrow or change the scope of claim 30. Following entry of this amendment, the objection to claim 30 should likewise be reconsidered and withdrawn.

35 U.S.C. § 112, Second Paragraph:

Claims 8, 25-29, 37 and 38 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite in reciting the relationship between the claimed conductors and inlets/outlets. Accordingly, these claims have been amended herein to clarify the relationship between the claimed conductors and inlets/outlets. This amendment does not, and is not intended to, narrow or change the scope of any of these claims. Following entry of this amendment, the rejection under § 112 should be reconsidered and withdrawn.

Prior Art:

Claims 1-3, 11, 12, 16, 33, 34, 36 and 61-64 were rejected under 35 U.S.C. § 102(a) and (e) as being anticipated by U.S. Patent Application Publication No. 2003/0022051 to Haluzak ("Haluzak"). For at least the following reasons, this rejection is respectfully traversed.

Claim 1 recites:

A multi-cell fuel cell layer, comprising:  
a substrate;  
an array of fuel cells each having an anode, a cathode, and an electrolyte disposed on said substrate;  
conductors electrically coupled to said fuel cell array;  
a fuel flow channel defined in an anode side of said substrate; and  
*a cathode air flow channel defined in a cathode side of said substrate.*  
(Emphasis added).

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Independent claim 16 similarly recites:

A fuel cell system, comprising:  
a plurality of fuel cell layers each including an array of fuel cells each having an anode, a cathode, an electrolyte and conductors disposed on a substrate, a fuel flow channel defined in an anode side of said substrate, and a cathode air flow channel defined in a cathode side of said substrate,  
wherein said fuel cell layers are alternatingly stacked.  
(Emphasis added).

Independent claim 61 recites:

An electrochemical system, comprising:  
means for supporting an array of fuel cells;  
*means defined in a first side of said support means for conveying cathode air across said array of fuel cells;* and  
means defined in a second side of said support means for conveying fuel across said array of fuel cells.  
(Emphasis added).

In contrast, Haluzak does not teach or suggest the claimed fuel cell layer or system in which a fuel flow channel is defined in one side of a substrate and a cathode air flow channel is defined in a second side of the substrate.

As shown in Figs. 4 and 5, each layer of the Haluzak system includes a substrate (62) which may be, for example, a silicon wafer. (Haluzak, paragraph 0025). Fuel cells, including the anode (50), electrolyte (42) and cathode (48), are formed on the substrate (62). (Haluzak, paragraph 0023). Fuel chambers (52) are formed or defined in, and extend through, the substrate (62). (Haluzak, paragraph 0025). However, there is no cathode air flow channel that is similarly defined in an opposite or cathode side of the substrate.

To the contrary, as clearly shown in Figs. 4-6, the fuel cells (50, 42, 48) are formed on one side of the substrates (62). The substrates are then stacked and placed in a frame (80) so as to allow air chambers (54) to exist between the substrates. However, there is no cathode air flow channel *defined in a cathode side of the substrates* as claimed.

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A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least this reason, the rejection of all the pending claims should be reconsidered and withdrawn.

Claims 4-7 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Haluzak and U.S. Patent No. 5,773,160 to Wilkinson et al. ("Wilkinson"). This rejection is respectfully traversed for at least the following reasons.

Claim 4 further recites "a cathode air inlet and an excess cathode air outlet defined in said substrate." The Office Action concedes that Haluzak does not teach this subject matter. (Action of 4/6/06, p. 5). Consequently, the Action cites to Wilkinson in this regard, particularly Wilkinson's teachings in Figs. 6A and 6B.

However, in these figures, Wilkinson is not teaching a layer of a fuel cell stack or a substrate on which fuel cells are disposed. Rather, Figs. 6A and 6B of Wilkinson illustrate a coolant fluid flow plate for use in cooling a fuel cell stack. (Wilkinson, col. 9, lines 20-29). According to Wilkinson, a "coolant flow field plate 98 is inserted at regular intervals [between the fuel cells] to provide a cooling layer ... for removing heat generated by the electrochemical reaction occurring in the cells of the active section." (Wilkinson, col. 10, lines 55-59).

Thus, as cited by the Office Action, Wilkinson teaches a coolant flow plate that includes an air inlet and outlet. Wilkinson does not teach or suggest a fuel cell layer in which a substrate, on which are disposed an array of fuel cells, includes the air inlet and outlet as recited in claim 4. Neither cited reference teaches this subject matter.

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"To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least this reason, the rejection of claims 4-7 should be reconsidered and withdrawn.

Claim 7, as amended herein, now recites that "said array of fuel cells are disposed within said fuel flow channel and said cathode air flow channel." This subject matter is not taught or suggested by the prior art of record. For at least this additional reason, the rejection of claim 7 should be reconsidered and withdrawn.

Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Haluzak and U.S. Patent No. 6,832,647 to Voss et al. ("Voss"). This rejection is respectfully traversed for at least the following reasons.

Claim 13 now recites "flow modification features associated with each either or both of said fuel flow channel and said cathode air flow channel, said flow modification features being configured to distribute a flow of fuel or air emerging from an inlet across a width of said fuel flow channel or said air flow channel, respectively." In contrast, the combination of Haluzak and Voss merely teaches "baffle plates (18, 20) position in the housing (16) to divide the interior of the housing (16) into two or more gas flow chambers (24, 26, 28 each containing a stack (32, 34, 36) of heat exchange units." (Voss, abstract). Voss does not teach or suggest flow modification features in connection with a fuel or air flow channel of a fuel cell stack or system as claimed.

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Thus, the combination of Voss and Haluzak does not teach or suggest the flow modification features as now recited in claim 13. For at least this additional reason, the rejection of claims 13 and 14 should be reconsidered and withdrawn.

Claims 9, 10, 17-24, 30-32 and 65 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Haluzak and JP 08-213043 to Takayanagi ("Takayanagi"). Claim 15 was rejected under 35 U.S.C. § 103(a) over the teachings of Haluzak taken alone. Claim 35 was rejected under 35 U.S.C. § 103(a) over the teachings of Haluzak and U.S. Patent Application Pub. No. 20030235745 to Mook et al. ("Mook"). These rejections are respectfully traversed for at least the same reasons given above with respect to the independent claims.

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Conclusion:

For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,



DATE: July 6, 2006

Steven L. Nichols  
Registration No. 40,326

Steven L. Nichols, Esq.  
Managing Partner, Utah Office  
**Rader Fishman & Grauer PLLC**  
River Park Corporate Center One  
10653 S. River Front Parkway, Suite 150  
South Jordan, Utah 84095

(801) 572-8066  
(801) 572-7666 (fax)

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Rebecca R. Schow